Evaluation of Beech Bark Disease on the Eastern Front Opportunity Area
Bradford Ranger District, Allegheny NF
July 1987

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Beech bark disease has been causing mortality of American beech on the northern portion of the Bradford Ranger District (ANF). A loss assessment of selected compartments and stands was completed in 1985, and routine examinations of stands with a beech component (greater than 20 square feet per acre) has occurred on the ANF since 1985.

Recently, Forest Pest Management personnel were requested to provide Integrated Pest Management information on the Eastern Front. One recommendation was an evaluation be conducted to determine the presence and abundance of beech scale infesting the beech trees. The following is the survey methods in response to the request by the Bradford RD to the FPM recommendation.

Objectives

The objectives of this survey are to determine:

1) If the beech scale is present within the Eastern Front and its amount and severity within the stands with greater than 9 square feet per acre of beech.

2) The amount of beech infected with Nectria spp. and the amount of mortality that has occurred from beech bark disease.

Methods

Pre-survey. The ANF Supervisor's Office, Timber Management Staff, was requested for a listing of all the stands within the Eastern Front. The listing included the stand characteristics and the tree species present within each stand. The information provided was used to find those stands with a beech component. The stands selected (see Appendix A) had greater than 9 square feet per acre of beech or the total cubic feet of beech was greater than 1.9 CCF, and had an average stand tree diameter greater than 7 inches. The stands within a four mile radius of two areas known to be infested with the beech scale will be examined first. The following is a listing of the compartment priorities:

PRIORITY	COMPARTMENTS
I	59
II	60, 61, 82, 84, 85, 74, 75, 73, 63, 64, 65, 72
III	62, 68, 67, 66, 70, 71, 69
IV	57, 58, 56

No stands within compartment 84 will be examined because the criteria for stand selection were not achieved. Also, a complete compartment examination has not been completed for compartment 56. Therefore, the field crew will use compartment maps and/or aerial photographs (if available) to find stands which may have beech present within compartment 56.

Survey. The stands selected will be systematically examined on the ground for twenty minutes to determine if the beech scale is present. If no beech scale is located, then the observers will note the stand was examined in Appendix A. The examination will cease when one or more infested beech trees are found. The first location of infested beech trees will serve as the first variable radius plot. A 10 BAF wedge prism will be used to tally trees within the plot. The field crew will record (see Appendix B) for each plot the name of the observers, the date, the aspect (using a compass), the elevation (using an altimeter), the weather conditions (general comments) at the time of observations, and the total basal area of all species.

The following information will be recorded for each beech tree:

1) Dbh for trees 6.0 inches or greater
2) Merchantable volume
3) Tree condition: live, dead, or chlorotic.
4) Slope position
5) Rate the amount of scale present for each of four aspects for the first 8 foot log.
6) Is Nectria spp. present?
7) Are there greater than 10 beech sprouts within six feet of the tree?
8) Are there greater than 8 clumps or sprouts of beech within a six foot radius of plot center?

Twenty plots will be placed in stands greater than 20 acres, and 10 plots within stands 20 acres or less. The plots will be placed (crossing topographic features) two chains from roads, pipelines, etc., and a minimum of two chains from another plot. The field crew should not bias their plot selection by placing plots where beech is present. Also, the data form in Appendix B will be used to record the observations.

Report. The results of the evaluation will be reported in a memo to the ANF Supervisor's Office and the Bradford Ranger District Timber Management Staffs describing the results of the survey. All of the stands visited will be listed in a table. The table will contain the following information:

1) Basal area and volume of beech:
   a) infested with the beech bark scale
   b) infected with Nectria spp.
   c) live and dead
2) Percentage of ~~trees with greater than 10 sprouts within six~~ plots with greater than 7 sprout in a six foot radius at plot center feet.

The report will be completed by January 31, 1988.

Costs.

2 -	Forestry technicians (GS-4) for 3 weeks:	$ 2100
1 -	Plant pathologist travel for 1 week:	200
	TOTAL	$ 2300

✓ ~~data~~ field data collected
✓ data entered

APPENDIX A

Total BA, % Stocking

Table 1. Listing of stands to examine for the beech scale in the Eastern Front Opportunity Area.

Compartment	Stand	Acres	BA	CCF	Origin	Scale
59	15	15	17	3.89	1918	no scale
59	23	23	14	2.44	1916	no scale
59	38	28	14	2.44	1925	no scale
59	39	46	14	2.44	1900	no scale
			59			
60	3	95	8	2.21	1890	no scale
60	12	96	13	3.46	1908	no scale
60	33 ✓	140	14	3.37	1908	scale present ✓
60	35	25	20	4.94	1918	no scale
61	10 ✓	63	13	2.86	1915	scale present ✓
61	13	160	14	3.64	1911	no scale
61	14	52	9	2.67	1920	no scale
61	22	160	8	2.22	1920	no scale
82	6	44	19	4.53	1906	no scale
82	11	43	10	2.55	1900	no scale
82	16	23	9	2.09	1907	no scale
82	20	98	19	4.88	1906	no scale
82	22	56	15	3.89	1901	no scale
82	24	26	12	3.00	1910	no scale
82	25	185	17	4.16	1905	no scale
82	28	40	18	3.85	1910	no scale
82	29	26	9	2.42	1907	no scale
82	30	37	14	2.97	1906	no scale
82	33	30	10	2.88	1908	no scale
82	34	31	13	3.10	1905	no scale
85	7	44	12	2.89	1897	no scale
85	19	77	8	2.03	1909	no scale
85	20	45	52	11.55	1919	no scale
85	27	59	10	2.21	1909	no scale
74	7	40	11	2.28	1905	no scale
74	9 ✓	19	26	5.04	1915	scale present ✓
74	11	93	22	5.11	1898	no scale
74	17	76	11	2.86	1902	no scale
74	33 ✓	40	11	2.28	1905	scale present ✓
75	12	78	13	3.14	1910	no scale
75	14	34	12	2.68	1910	no scale
75	15	40	14	3.15	1915	no scale
73	3	38	26	6.20	1901	[illegible] no scale (10-21)
73	4	64	25	5.50	1906	no scale

20 stands/wk

Table 1. Listing of stands to examine for the beech scale in the Eastern Front Opportunity Area.

Compartment	Stand	Acres	BA	CCF	Origin	Scale
63	1 ✓	46	17	3.79	1887	scale present
63	4 ✓	11	10	2.17	1906	scale present
63	6	19	10	1.70	1910	no scale
63	22	31	21	4.14	1905	no scale
63	26	19	13	2.43	1907	no scale
64	4 ✓	83	8	2.08	1903 wk 1	scale present
64	5 ✓	115	14	3.30	1903	scale present
64	9	39	9	2.33	1903	no scale
64	12	20	40	11.44	1906	no scale
64	14	77	10	2.04	1913	no scale
64	15	79	11	3.04	1907	no scale
64	18	18	9	2.34	1906	no scale
64	24	20	10	2.52	1906	no scale
65	1	26	9	2.07	1926	no scale
65	3 ✓	49	17	4.29	1906	scale present ✓
65	10	60	26	5.68	1906	no scale
72	7	43	12	2.52	1911	no scale
72	10	37	18	3.99	1917	no scale
72	12	63	19	3.77	1916	no scale
72	13	9	9	2.28	1910	no scale
72	16	9	12	2.50	1908	clear cut
72	17	24	31	8.21	1916	no scale
72	21	35	28	7.22	1916	no scale
72	22	25	20	4.63	1900	clear cut - Atleast in part
72	23	35	18	3.64	1906	no scale
72	27	22	34	7.74	1897 wk 2	no scale
72	28	15	20	4.00	1901	no scale
72	29	22	23	4.79	1901	no scale
72	30	31	14	3.64	1897	no scale
62	4	85	11	2.25	1908	no scale
62	7	15	20	5.32	1902	no scale
62	18	34	10	2.42	1915	no scale
62	19 ✓	195	15	3.17	1918	scale present ✓
62	24 ✓	56	45	10.87	1890	scale present ✓
62	27	46	11	2.87	1906	no scale
68	9	32	10	1.83	1919	No
68	15 ✓	26	25	4.78	1916	Yes
68	20 ✓	53	22	6.14	1920	Yes
67	20	34	9	3.03	1910	

Table 1. Listing of stands to examine for the beech scale in the Eastern Front Opportunity Area.

Compartment	Stand	Acres	BA	CCF	Origin	Scale
66	1 ✓	36	14	4.10	1906	Yes
~~66~~	~~2~~	~~10~~	~~20~~	~~4.02~~	~~1926~~	
66	3 ✓	28	14	3.27	1913	Yes
66	7 ✓	26	15	2.89	1931	Yes
70	2	8	10	3.11	1901	Yes
70	5	54	36	8.60	1870	
70	6	87	27	6.00	1901 wk 3	
70	7	118	15	3.89	1905	
70	8	19	30	7.85	1904	
70	9	25	25	6.97	1895	
70	12	26	9	2.94	1905	
70	13	11	20	3.04	1902	
70	15	57	28	6.72	1905	
70	20	51	16	3.56	1900	
70	21	18	32	6.91	1907	
70	22	44	21	5.32	1902	
70	23	27	26	6.16	1880	
70	25	27	28	7.21	1901	
70	26	35	9	2.44	1903	
71	1 ✓	78	39	8.89	1905	Yes
71	2 ✓	82	47	10.50	1918	
71	3 ✓	113	13	2.99	1918	
71	4 ✓	95	11	2.27	1905	
71	5	32	21	5.17	1908	
71	6 ✓	34	22	5.73	1903	
71	7 ✓	14	21	5.20	1908	
71	8 ✓	39	9	2.29	1903 wk 4	
71	10	34	17	3.99	1905	
71	11 no scale	88	19	4.51	1905	No
71	19	70	10	1.87	1900	No
71	20	44	12	2.84	1900	Yes
71	22	48	19	4.88	1910	No
71	24	37	12	2.88	1900	Yes
71	25	22	14	2.92	1900	
71	26	25	17	4.04	1910	
71	31	53	15	3.73	1900	
69	4 ✓	157	24	5.94	1920	Yes
69	6 ✓	49	20	5.00	1920	
69	8 ✓	51	17	4.42	1920	
69	9 ✓	67	29	7.66	1910	
69	18 ✓	152	18	4.09	1930	
69	24 ✓	26	16	4.01	1930	
69	26 ✓	18	9	2.17	1917	
57	21	65	17	3.78	1910	No

Table 1. Listing of stands to examine for the beech scale in the Eastern Front Opportunity Area.

Compartment	Stand	Acres	BA	CCF	Origin	Scale
58	5	8	10	1.58	1903	No ↓
58	23	123	13	2.67	1905	
58	25	82	19	3.61	1910	
58	27	46	30	9.33	1900 WKS	

Total # Stands = 125

Total Acres = 6406

$\bar{x}$ BA = 17.448

$\bar{x}$ CCF = 4.180

$\bar{x}$ Age = 1908

APPENDIX B

The following lists the information to be written within each of the columns on the attached data sheet. The field crew will fill in each line of each column with a number listed below.

PLOT: enter the plot number

ASPECT: enter the bearing recorded on your Silva compass (or 999 if flat)

ELEVATION: enter the reading from the altimeter (in feet)

TOTAL BA: enter the total basal area observed in the plot

DBH: enter the diameter at 4.5 feet above ground level to the nearest 1.0 inch

MERCH. VOLUME:
- a) saw.: enter the total number of 8 foot sawlogs (11" dbh to 10" dib)
- b) cds.: enter the total number of 8 foot cords (6" dbh to 3" dib)

TREE CONDITION: enter one of the following numbers
- a) 0 = dead
- b) 1 = chlorotic (do not use this category after the third week in August)
- c) 2 = live

SLOPE POSTION: enter one of the following numbers:
- a) 0 = no slope
- b) 1 = ridge top
- c) 2 = upper slope
- d) 3 = mid slope
- e) 4 = lower slope
- f) 5 = base of slope

SCALE RATING: enter one of the following number for the amount of scale present for each aspect of the first 8 feet of the beech tree:
- a) 0 = no scale present
- b) 1 = <50% of the area covered
- c) 2 = >50% of the area covered

NECTRIA: enter a "1" if Nectria is present, or a "0" if none is present.

>10 SPROUTS: enter a "1" if there is greater than 10 beech sprouts within six feet of the tree, or a "0" if there is less than 10

SPROUTS CENTER: enter a "1" if there is greater than 8 beech sprouts or clumps within a six foot radius of the center point, or a "0" if there is less than 8. A beech tree will be counted if the beech is taller than 2 inches and has at least 2 normal-size leaves, up to poles. Count clumps of beech root suckers that originated from the same spot as one stem.

Observers: _____ Compartment: _____ Stand: _____ Weather: _____

PLOT	ASPECT	ELEVATION	TOTAL BA	DBH	MERCH. SAW.	VOLUME CDS.	TREE CONDITION	SLOPE POSITION	SCALE RATING N	S	E	W	NECTRIA PRESENT	SPROUTS CENTER